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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/802,186	03/17/2004	Zhi-Yuan Cheng	ASC-025DV2C1	3869
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GOODWIN PROCTER LLP PATENT ADMINISTRATOR EXCHANGE PLACE BOSTON, MA 02109-2881			EXAMINER HU, SHOUXIANG	
			ART UNIT 2811	PAPER NUMBER
			MAIL DATE 10/26/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/802,186	<b>Applicant(s)</b> CHENG ET AL.	
	<b>Examiner</b> Shouxiang Hu	<b>Art Unit</b> 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 62-77 is/are pending in the application.
- 4a) Of the above claim(s) 72 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 62-71 and 73-76 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8/8/07 &amp; 8/6/07</u>                                       | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 62, 66-71, 73 and 77 are rejected under 35 U.S.C. 102(b) as being anticipated by Srikrishnan (US 5,882,987).

Srikrishnan discloses a method for forming a semiconductor structure (similar to what are shown in Figs. 1-6; also see col. 4, lines 35-67), the method comprising: forming a first heterostructure (similar to what is shown in Fig. 5) by depositing a SiGe layer (510') over a first substrate (500; Si); bonding said first heterostructure to a second substrate (530) to form a second heterostructure (similar to what is shown in Fig. 5C); and splitting said second heterostructure along the naturally defective region formed through implanting naturally ions of hydrogen into the first heterostructure, wherein a portion of said first heterostructure remains on said second substrate after the second heterostructure is split (similar to what is shown in Figs. 5G), wherein the SiGe layer (510') can always be naturally formulated as  $\text{Si}_{1-y}\text{Ge}_y$ , and, such a  $\text{Si}_{1-y}\text{Ge}_y$  layer (510') is naturally substantially relaxed, since it is formed on a SiGe buffer/intermediate layer (505), thus it is at least substantially more relaxed than a similar  $\text{Si}_{1-y}\text{Ge}_y$  layer directly

formed on the silicon substrate; and/or, since it is naturally thermally annealed during the formation of the overlying oxide layer (515) through thermal oxidation which naturally requires substantially high temperature.

Regarding claim 66, the method of Srikrishnan further comprises the step of forming an insulating layer (at least the top portion of the oxide layer (515 in Fig. 5B) on the  $\text{Si}_{1-y}\text{Ge}_y$  layer (510')

Regarding claims 67, it is noted that the  $\text{Si}_{1-y}\text{Ge}_y$  layer (510') in Srikrishnan is kept to be substantially planar (as shown in Fig. 5) during all the process steps before the bonding step; thus, all theses process steps (before the bonding) are naturally capable of functioning to planarize the  $\text{Si}_{1-y}\text{Ge}_y$  layer (510').

Regarding claim 70, the method of Srikrishnan further comprises the step of cleaning (see col. 5, lines 15-23).

Regarding claim 71, it is noted that the step of splitting said second heterostructure in Srikrishnan naturally comprises the step of annealing so as to fracture the implanted region (see col. 5, lines 33-45).

Regarding claim 73, the method of Srikrishnan naturally further comprises the step of removing at least a portion of the  $\text{Si}_{1-y}\text{Ge}_y$  layer (510') from the second heterostructure, after said step of splitting, since at least some surface molecules of the  $\text{Si}_{1-y}\text{Ge}_y$  layer (510') are inevitably removed during the selective etching and complete removal of the overlying oxide layer (505; see Figs. 5F and 5G).

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 76 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fitzgerald in view of Srikrishnan.

The disclosure of Fitzgerald is discussed as applied to claims 62, 66-71, 73 and 77 above.

Srikrishnan does not expressly disclose that the method can further comprise a step of reusing the remaining of the first heterostructure after the splitting. However, Srikrishnan does expressly further teach (col. 5, lines 35-39) that the remaining of the first heterostructure (500' in Fig. 5D) is essentially same as the beginning substrate (500). And, one of ordinary skill in the art would readily recognize that such essentially-same-as-the-beginning-substrate can be desirably reused so as to reduce the manufacturing cost.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to develop the method of Srikrishnan with the remaining of the first heterostructure being reused, so that a method for forming a semiconductor substrate with reduced cost would be obtained.

4. Claims 63-65, 74 and 75, as being supported by the elected species and as being best understood in view of the claim objections above, are rejected under 35 U.S.C. 103(a) as being unpatentable over Srikrishnan in view of Gaul (Gaul et al., US 5,240,876).

The disclosure of Srikrishnan is discussed as applied to claims 62, 66-71, 73, 76 and 77 above.

Srikrishnan does not expressly disclose that the method can further comprises a step of forming a layer of strained Si after the splitting, one of the ordinary skill in the art would readily recognized that, as evidenced in Gaul (see the cover page figures), a layer of strained Si (14) can be desirably formed on a SiGe layer (12), for forming a field effect transistor with improved/desired performance.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to develop the method of Srikrishnan by further including the step of forming the layer of strained Si on the Si<sub>1-y</sub>Ge<sub>y</sub> layer after splitting, per the teachings of Gaul, so that a method for forming a semiconductor device with improved/desired performance would be obtained.

### ***Double Patenting***

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated

by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 62-71 and 73-77 are rejected on the ground of nonstatutory double patenting over claims 1-11 and 28-36 of U. S. Patent No. 6,750,130, since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: a method forming a semiconductor structure comprising: forming a first inherently heterostructure by depositing a naturally relaxed layer such as Si<sub>1-y</sub>Ge<sub>y</sub> over a first substrate; bonding the first inherently heterostructure to a second substrate to form a second inherently heterostructure; and splitting the second inherently heterostructure so as to have a portion of the first inherently heterostructure remaining on the second substrate after the splitting.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of

the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is 571-272-1654. The examiner can normally be reached on Monday through Friday, 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>.



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Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SH  
October 17, 2007



SHOUXIANG HU  
PRIMARY EXAMINER